# Finding Discipline in an Agile Acquisition Process

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# Outline

The Question

On "Rigor"

A New IT Acquisition Process

Discipline in the Existing Process

Discipline in the New IT Acquisition Process

Recommendations

# The Question:

How can rigor be accomplished within DoD's new IT Acquisition Process?

- In particular: how can the new IT Acquisition Process maintain rigor similar to that found in today's traditional approach while still achieving the objectives of a more flexible, responsive process?

# Rigor – What Do We Really Want?

*Rigor:*

**1a (1) :** *harsh inflexibility in opinion, temper, or judgment* **:** severity
     **(2) :** *the quality of being unyielding or inflexible* **:** strictness
     *…*

  **b :** *an act or instance of strictness, severity, or cruelty*

**2 :** *a condition that makes life* difficult*, challenging, or uncomfortable;*

**3 :** *strict precision* **:** exactness *<logical rigor>*

**4a obsolete :** rigidity*,* stiffness

  **b :** *rigidness or torpor of organs or tissue that prevents response to stimuli*
  **c :** rigor mortis

# *Discipline*, not Rigor

*Discipline:*

*1 :* *punishment*

*2 :* *a field of study*

*3 :* training that *corrects, molds*, or perfects the mental faculties or moral character

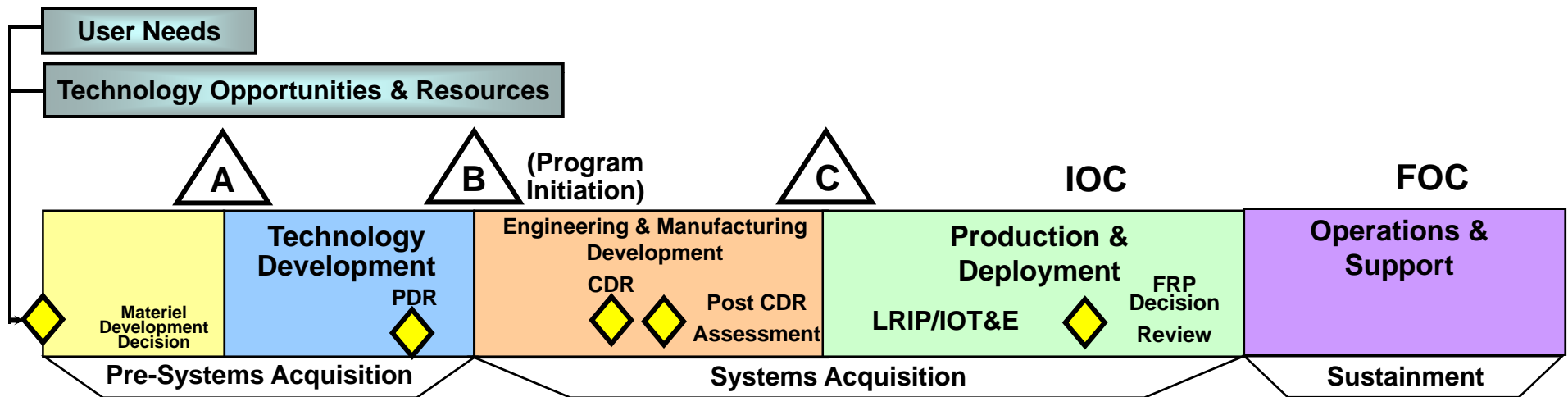*4 :* a rule or system of *rules governing conduct* or activity

*5 a :* control gained by enforcing *obedience or order*
   *b :* *orderly or prescribed conduct or pattern of behavior*
   *c :* *self-control*

# Defense Acquisition Business Process

# Observations about Today's Process

Frequent underlying problems in programs using this model include
- lengthy gestation periods
- management of requirements
- failures in acceptance tests

Significant duration of typical program leads to heavy dependence on documentation to maintain "corporate memory."

*The undesirable side effects of early decisions,*
*both technical and non-technical,*
*only become visible years later,*
*usually during integration and test*

# DSB Report: New Acquisition Process for IT
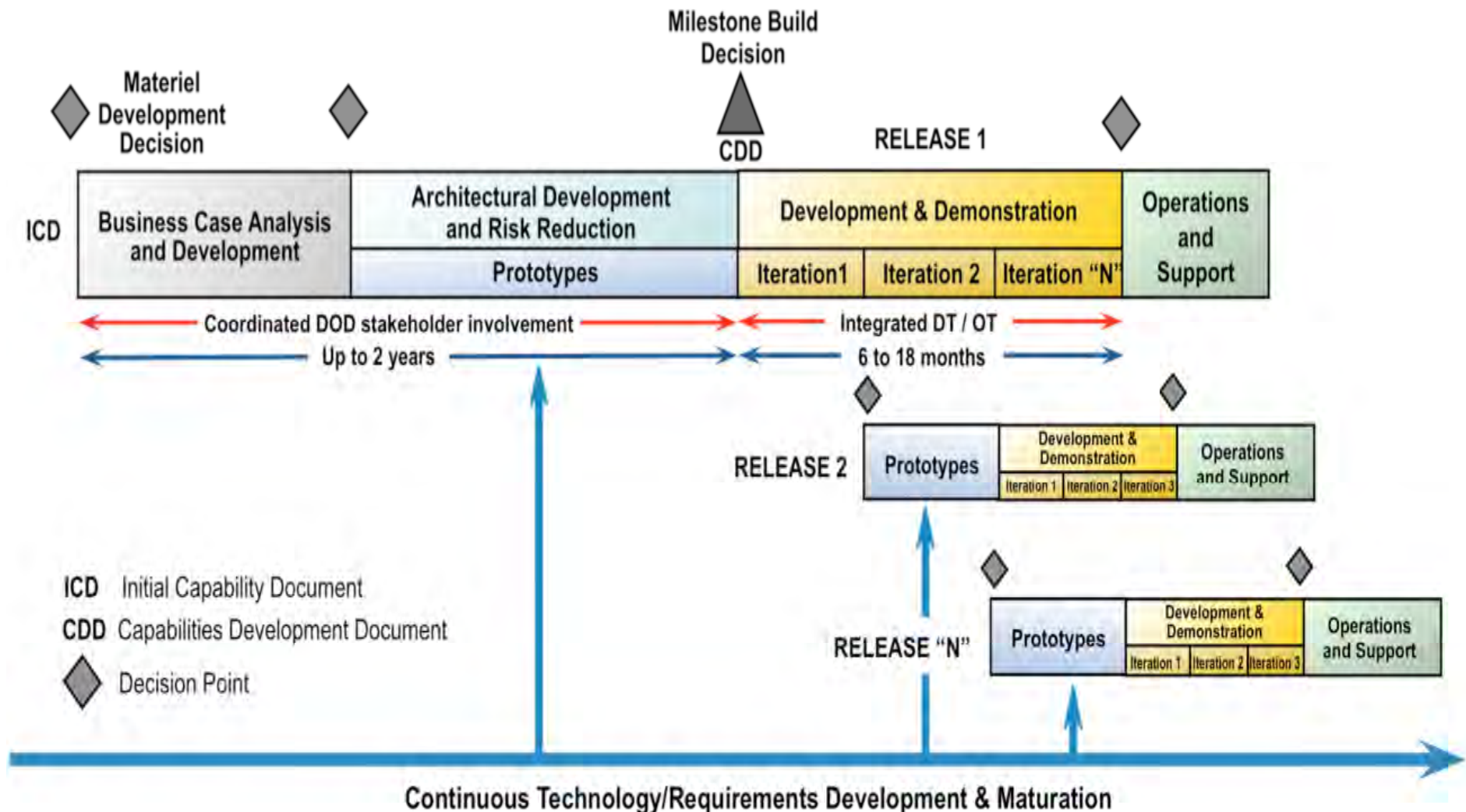
# Tenets of a New IT Acquisition Process

Some key features of the new IT acquisition process:
- frequent, usable releases of capability
  - early, successive prototyping to support an evolutionary approach
  - deliver early and often
  - incremental and iterative development and testing
  - executable and testable product
- early and continual involvement of the user
- rationalized requirements
- modular, open systems approach with standard interfaces
- knowledgeable and experienced IT workforce
- flexible, tailored processes

# Discipline in Today's Approach



Integrated Defense Acquisition, Technology, and Logistics Life Cycle Management System

# Features of Today's Discipline

*External scrutiny* by decision makers
  - mandated decision events (Milestones A, B, C, ...)

*Operational expectations* documented in the Initial Capabilities Document (ICD) and Capabilities Development Document (CDD) artifacts
  - informal English language specifications

Numerous *plans* to document both business and technical approaches
  - by program offices and contractors
  - from management of technology to deployment

Documentation of *processes with compliance audits*
  - ensuring that processes are followed

Financial *performance reported against plan* (earned value)

Identification and management of *risks*

# Key Elements of Today's Process

**Requirements**: key artifacts used to

- govern development
- form the basis of major reviews
- orchestrate product evaluation, user acceptance, sell-off

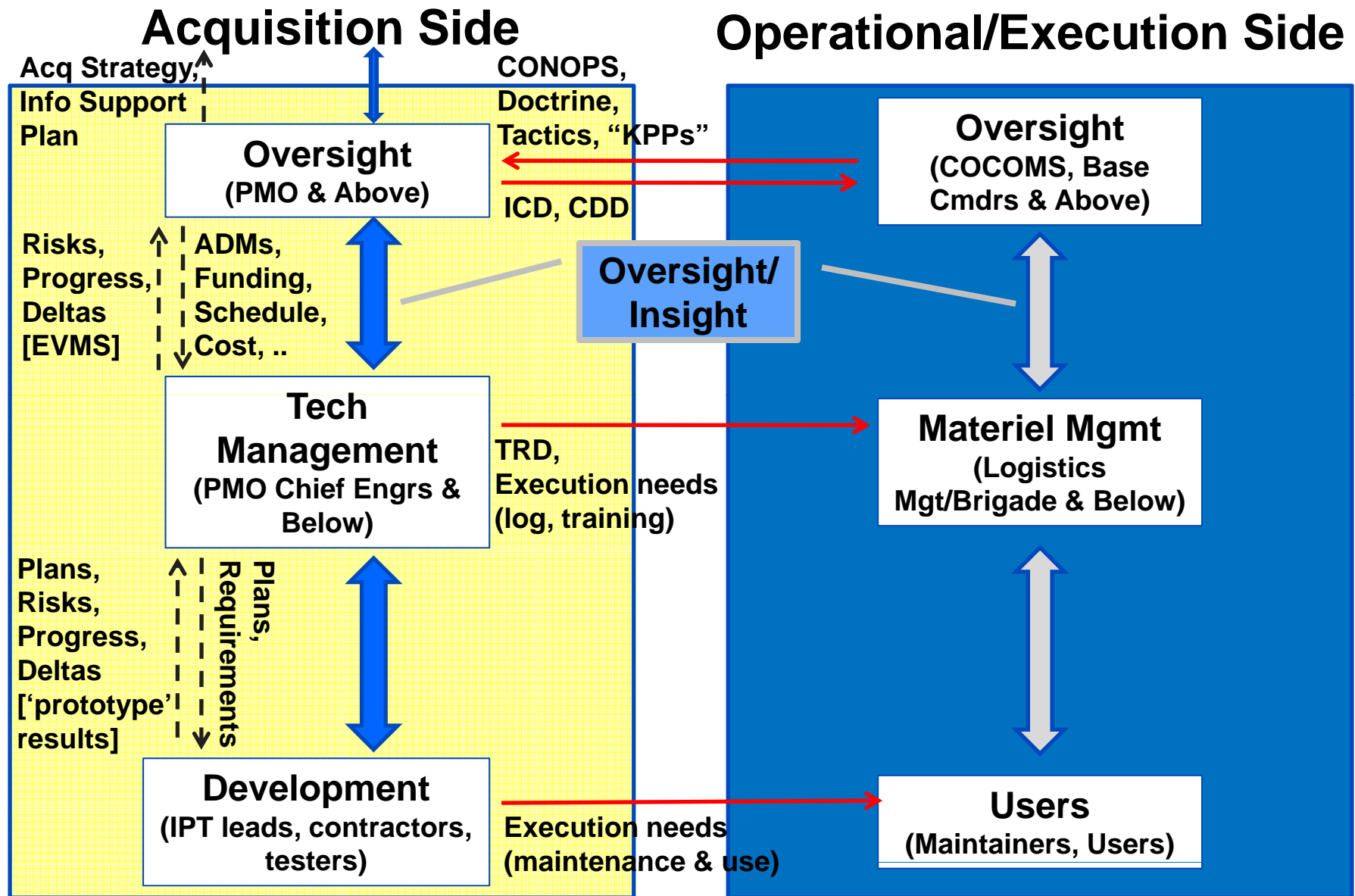**Systems engineering documentation**:

- Subject Matter Experts (SMEs) at various levels
  - act in part as advocates for their *perception* of user expectations
- users sporadically involved (e.g., attend reviews) until field trials and acceptance testing
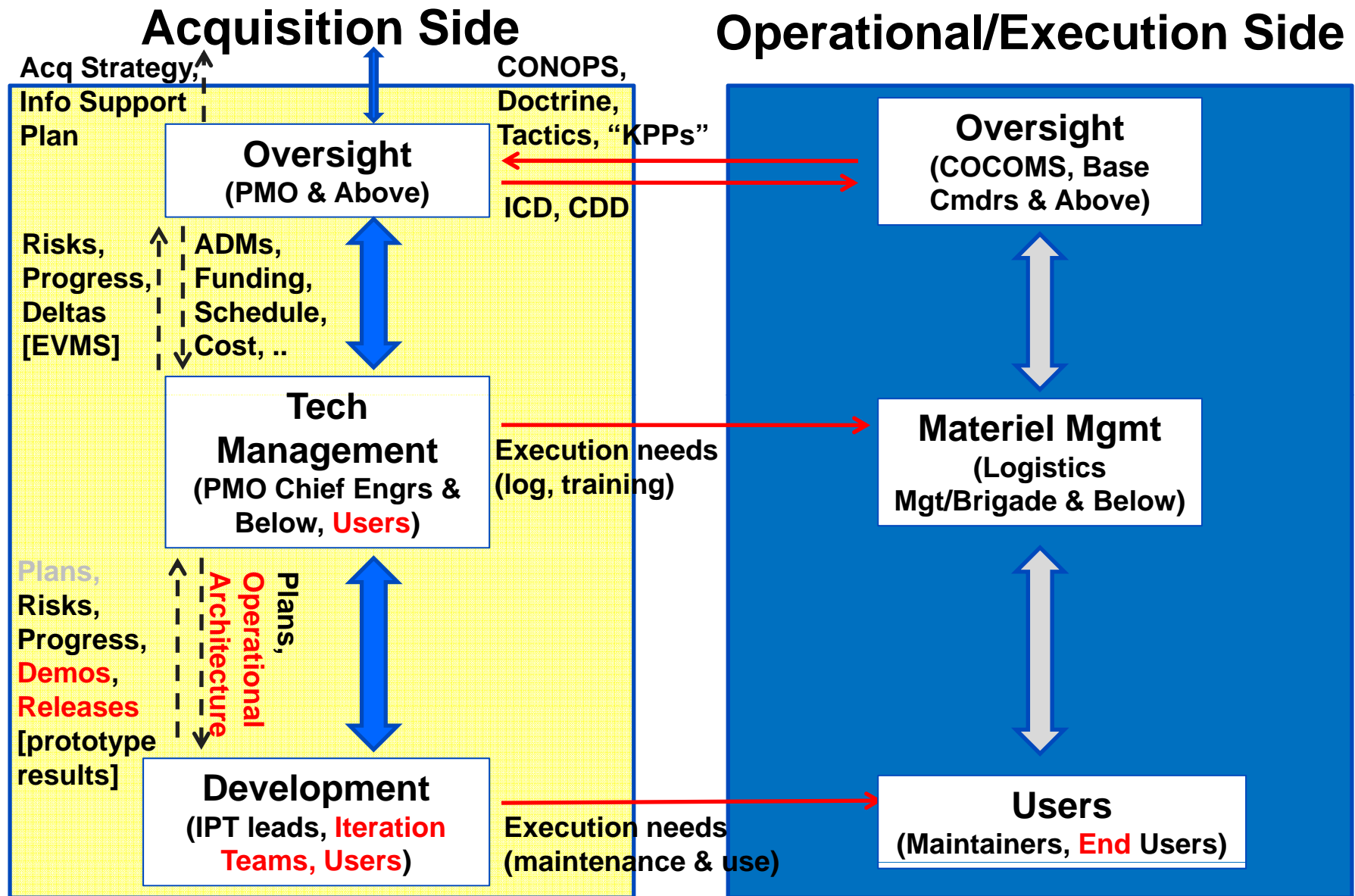
**Reviews**:

- progressively more detailed evaluations of information about product(s)
- synchronized with major decision points to provide basis for decision makers to appropriately intervene to influence development.

# Model of As-Is Discipline

## Acquisition Side

## Operational/Execution Side

Acq Strategy, Info Support Plan

**Oversight**
(PMO & Above)

CONOPS, Doctrine, Tactics, "KPPs"

ICD, CDD

**Oversight**
(COCOMS, Base Cmdrs & Above)

Risks, Progress, Deltas [EVMS]

ADMs, Funding, Schedule, Cost, ..

**Oversight/ Insight**

**Tech Management**
(PMO Chief Engrs & Below)

TRD, Execution needs (log, training)

**Materiel Mgmt**
(Logistics Mgt/Brigade & Below)

Plans, Risks, Progress, Deltas ['prototype' results]

Plans, Requirements

**Development**
(IPT leads, contractors, testers)

Execution needs (maintenance & use)

**Users**
(Maintainers, Users)

# Discipline in the New IT Acquisition Process

## Acquisition Side

## Operational/Execution Side

Acq Strategy, Info Support Plan

CONOPS, Doctrine, Tactics, "KPPs"

**Oversight**
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Risks, Progress, Deltas [EVMS]

ADMs, Funding, Schedule, Cost, ..

**Tech Management**
(PMO Chief Engrs & Below, Users)

Execution needs (log, training)

**Materiel Mgmt**
(Logistics Mgt/Brigade & Below)

Plans, Risks, Progress, Demos, Releases [prototype results]

Plans, Operational Architecture

**Development**
(IPT leads, Iteration Teams, Users)

Execution needs (maintenance & use)

**Users**
(Maintainers, End Users)

# Highlighted Differences

- The content of the information flows
- Deltas include
  - familiar items (deviations from plans and requirements)
  - use cases deferred to future iterations/releases, based on experience in a given iteration/release
- Demonstrations and formal Releases provide feedback
- Use cases:
  - take the place of functional requirements
  - give actionable specification of behavior as well as the context
  - provide direct mapping to testing and evaluation

The central role formerly served by requirements is replaced by the *Operational Architecture.*

# The Operational Architecture

A structured representation of:

- doctrine, tactics, and CONOPS
- the set of use cases that formally characterize behavior of the envisioned system in operational terms
- quality attributes that characterize performance and other system-level characteristics of the envisioned system
  - beyond the functions the system will perform, e.g., security, reliability
- the range of technology to be employed
- constraints such as mandated standards

Evolves

- through the information and experience gained in each iteration
- across multiple releases
- becomes the living information about the system context

# Discipline in the New IT Acquisition Process[1]

*External scrutiny* by decision makers at mandated decision events as well as the end of iterations and releases

- short duration of iterations and releases provides feedback to decision makers on choices they <u>personally</u> made, enabling corrective actions

*Operational expectations*:

- well-formed use cases more detailed than typical CDDs
  - retains context and fine points influencing the behavior
  - more likely to be directly usable by development team
- Operational Architecture more actionable explication of user expectations, constraints, quality attributes

*Plans* and *compliance audits*

- frequent sprints of much shorter duration require less elaborate plans
- compliance audits replaced by regular delivery of executable capability

# Discipline in the New IT Acquisition Process$_2$

PLUS

*Personnel*

- time-constrained iterations force personnel from all disciplines/roles to work together repeatedly
  - amplifies experience in executing all parts of development cycle together, from up-front systems analysis to test, integration, and deployment

*Deltas*

- use case deferrals, shortfalls, test deficiencies are in domain-relevant language of end users and decisions makers
  - avoids translation from technical to domain terminology

# Bottom Line

When we speak of discipline, we are advocating the creation of a more disciplined mechanism (structures + processes) to:

- describe user expectations
- enhance communications between user and acquisition/developer communities
- acknowledge there is of necessity an evolving understanding of what is operationally required

❖ *The Operational Architecture is the key set of artifacts that document the results of the employment of this mechanism.*

❖ *The processes and mechanisms establish the ongoing interaction among players in the user and acquiring organizations.*

# Recommendations

- Conduct effort to take this approach down to the next level of detail
- Make some additions to the proposed process:
  - Begin each iteration with an architecture segment
    - Assess architecture and potential extensions/revisions
  - Begin each release cycle with a reassessment of the business case
    - Capture what has changed in system context and environment
- Revise the culture
  - Organizational structure, rewards systems, communication style, decision-making style, staffing model (roles, team make-ups, etc.)
- Look for personnel with special traits
  - Self-starters, team players, multiple roles, communicators, adaptable
- Institute new training
  - Assists with culture change
- Resolve issues in customer interaction
  - Access to true end users is an essential element of the new process

# QUESTIONS ?

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# Acronyms

CDD: capabilities development
    document

CDR: critical design review

COCOMS: combatant commanders

CONOPS: concept of operations

DAU: Defense Acquisition University

DSB: Defense Science Board

DoD: Department of Defense

DT: developmental test

EVMS: earned value management
    system

FOC: full operational capability

FRP: full rate production

ICD: initial capability document

IOC: initial operational capability

IOT&E: operational test and evaluation

IPT: integrated product team

IT: information technology

KPP: key performance parameter

LRIP: low rate initial production

OT: operational test

PDR: preliminary design review

PMO: program management office

SME: subject matter expert

TRD: technical requirements document